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Genetic Algorithm Parameters Optimization for Bi-criteria Multiprocessor Task Scheduling using Design of Experiments

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Abstract : multiprocessor task scheduling is a NP-hard problem and Genetic algorithm (GA) has been revealed as an excellent technique for finding an optimal solution. In the past, several methods have been considered for the solution of this problem based on GAs. But, all these methods considers single criteria and in the present work, minimisation of the bi-criteria multiprocessor task scheduling problem has been considered which includes weighted sum of makespan & total completion time simultaneously. Efficiency and effectiveness of genetic algorithm can be achieved by optimization of its different parameters such as crossover, mutation, crossover probability, selection etc. The effects of GA parameters on minimization of bi-criteria fitness function and subsequent setting of parameters with the levels have been accomplished by central composite design (CCD) approach of response surface methodology (RSM) of Design of Experiments. The experiments have been performed with different levels of GA parameters and analysis of variance has been performed for significant parameters for minimisation of makepan and total completion time simultaneously

Keywords : Multiprocessor task scheduling, Design of experiments, Genetic Algorithm, Makespan, Total completion time.
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